

REMARKS

Applicants respectfully request reconsideration of the above-captioned application. Claims 1-5, 9-24, 28-43 and 45-58 are currently pending. Claims 6-8, 25-28 and 44 have been canceled. Support for new claims 57 and 58 is found, for instance, at page 8, lines 24 and 25.

Applicants note with appreciation that the Examiner included an indication that claims 3-5, 16 and 21-24 contain allowable subject matter. In response, applicants have placed claims 3, 16 and 21, as well as related claims 42 and 55, in independent form. In light of these changes, applicants respectfully submit that at least claims 3-6, 16, 21-24, 42 and 55 are currently in allowable form.

The Office Action places the restriction requirement in final form based on the assertion that "not all method claims track corresponding device claims." Applicants have reviewed the claims and believe that the method claims do, in fact, track the apparatus claims with the possible exception of claim 44, which has been canceled. The primary difference between the claims is the inclusion of such generic language as "preparing" and "forming." It is therefore believed that the restriction requirement is improper under MPEP §806.05(f) insofar as the actual process language is generic. Accordingly, applicants respectfully request reconsideration and withdrawal of the restriction requirement now that it has been pointed out that the apparatus claims do, in fact, track the method claims, and vice versa. Should the Office be of a different opinion, the Office is asked to point to specific instances where the claim sets do not track each other.

The Office Action also includes an objection to claims 8, 10, 24 and 27 to the term "and/or." The claims have been adjusted to place them in more conventional U.S. claim format. Accordingly, withdrawal of this objection is respectfully requested.

The Office Action also includes a rejection of claims 1, 6-10, 17-19, 25-29 and 37-39 under 35 U.S.C. §102(b) as allegedly being anticipated by the Nishizawa et al patent (U.S. Patent No. 4,329,625); and a rejection of claims 2, 11-15, 20 and 30-36 under 35 U.S.C. §103 as allegedly being unpatentable over the Nishizawa et al patent in further view of the Worley patent (U.S. Patent No. 5,466,948). These rejections are respectfully traversed.

The Nishizawa et al patent discloses in Fig. 1B and the text related thereto at column 5, line 52 through column 6, line 60, a field effect photo-transistor with an n^+ type source region 3, an n^+ type drain region 4 and a p^+ type gate region 5. A transparent insulating film 6 is formed on top of a gate region 5, whereby constituting the light-receiving portion. As illustrated, the gate region 5 is illustrated as being shallower than the source and drain regions 3 and 4, although it is generally accepted that patent drawings are not drawn to scale.

The independent claims have been amended to recite that there is a discontinuous control film with a plurality of openings located on the first region having the relatively shallow depth wherein the first region was formed to a relatively shallow depth using the openings of the control film pattern, and an electrode physical contact with the first region at a plurality of locations through the plurality of openings in the discontinuous control film. Because of this structure, unlike a conventional structure in which the electrode is directly formed on the silicon substrate, capacitance increases and a tunneling dark current decreases due to a

strong reverse bias and the ultra-shallow junction decreases, thereby preventing breakage of junctions. In addition, the multi structure serves to increase a voltage-capacitance resistance even if a high electric field is applied thereto, as disclosed at page 12, lines 13-19, for instance, of the originally filed specification. Nothing analogous to this is found in the Nishizawa et al patent.

With respect to the plurality of openings in the discontinuous control film, the Office suggests that the Nishizawa et al patent discloses this by the two openings in the insulating film 6, one for the source region and the other for the drain region. This is not an appropriate argument insofar as neither the source of the drain would be analogous to the first region of the present claims, since they are of a deeper depth than the gate region 5. In addition, the gate region 5 does not have a plurality of openings connecting it to an electrode.

In this regard, the Office also suggests that the Worley patent discloses in Figure 1B a first region 132 on which an electrode 140 is patterned in such a way as to be in discontinuous contact with the first region. What is shown in Figure 1B in relevant part is a diode 112 having a shallow end diffusion region or implant 132 in the center of the top surface of a p-type island 106 acting as a cathode and anode, respectively, of the detector, as disclosed in column 3, line 56 through column 4, line 12. What is also disclosed is that the cathode 132 of the detector is coupled to a metal interconnect line 140 by metal-to-n⁺ diffusion contacts 142. There is no indication whatsoever that the first region was formed to a relatively shallow depth using the openings of the control film pattern. This aspect of the present invention is disclosed and discussed, for example, at page 11, lines 6-30 of the originally filed application. This mechanism for the first region can have a large size but a shallow

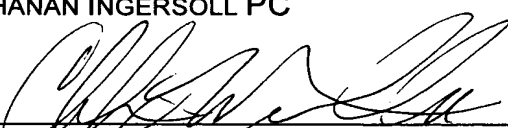
depth. There is no appreciation for this aspect of the present invention in the applied art. Although the present independent claims recite the device in a product-by-process format, the resulting product is distinctly different and patentably different from the applied art because of this mechanism because of its ability to have a broader and shallower depth for the first region. While the Office has indicated that it has ignored the process recitations of the product claims, applicants respectfully submit that under MPEP §2113 and relevant case law, the "structure implied by the process steps should be considered when assessing the patentability of the product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product." (Citations omitted).

In light of the foregoing, applicants respectfully request reconsideration and withdrawal of the outstanding rejections. Should any residual issues exist, the Examiner is requested to contact the undersigned at the number listed below.

Respectfully submitted,

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